

Implications of HB 831
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What is the intent of HB831?

- 1) Address Trout Unlimited Smith River Decision
- 2) Protect prior appropriators
- 3) Provide methods to allow new ground-water appropriations by offsetting adverse effects via mitigation and/or aquifer recharge.

What it requires?

- 1) Applicants must establish the "potentially affected area" defined in HB 831 as:

"the area or estimated area of ground water that will be affected by a proposed project."

This area could easily be very large. Some examples to be provided in slide presentation.

- 2) Quantify the zone or cone of influence of a pumping well or a pumping well field. Generally, the above information has always been a part of the beneficial use permitting when it relates to ground water.

Now it requires that "all potentially" affected streams, surface water features including irrigation ditches, springs, etc. be addressed. The focus is to define/quantify any net depletions that may occur as a result of proposed well pumping.

- 3) In the event that it is deemed that the net depletion defined in the aforementioned analyses leads to any adverse impacts, then the next requirement is to define a means of offset using either mitigation or recharge.
- 4) Mitigation involves reallocated existing water rights most likely by retiring irrigated agricultural acreage and then leaving water either in a ditch or stream. There could be various shades of gray to this depending upon the situation.
- 5) Aquifer recharge generally involves recharging water into the underlying aquifer using methods such as infiltration basins, wells or ponds. Each method has its own advantages and disadvantages.

How does it work?

- 1) Ground-water evaluation phase: this is a part of the pre-HB831 process. The success or lack of success in quantifying net depletions is entirely dependent upon just how complex the existing hydrogeologic conditions are. One of the main limitations or threshold problems is the 0.01 foot of drawdown or cone of depression criterium historically required by DNRC to define the potential area of well impact. Please note that DNRC's rules do not establish such criteria, rather it is policy not subjected to public comment per the rule-making process. Use of the 0.01 foot criterium is not very practical. This same criterium will be even more problematic in HB831 evaluations. This will be illustrated later in this presentation.
- 2) The degree of practicality is inversely proportional to the number of surface water features that are quantified or mapped within the "potentially affected area." If there are more than one or two streams, it probably is not practical to define the amount of depletion without use of numerical models and without collection of substantial amounts of data. Even use of models has substantial limitations owing to the general lack of historical data.

For instance, it has been my experience that literally dozens of streams, irrigation ditches, and springs will be contained or intercepted within the potentially affected area. Some features can be eliminated from the analysis if it can be shown that they are not hydraulically connected with the ground-water system. However, this requires current and historic information which are normally not available. Typically, it takes many years to collect reliable and representative data in complex natural hydrologic systems.

Gallatin Valley example.

- 3) How do we quantify net depletion?

Establishment of potentially affected area.

Testing phase evaluation. Most pumping tests are short term, generally lasting about three days. The zone of influence is thereby very small. Hence, we must extrapolate a zone of influence from short-term analysis to long-term consequences. Generally, hydrogeologic conditions tend to vary substantially as the scale of the project increases and length of time involved increases. In theory with HB831, we would need to understand each intercepted area's ground-water properties. Is this practical? No. Not in most real ground-water systems.

- 4) The next step is to model the system. Hence, we are now taking our imperfect understanding of natural systems and then extrapolating that imperfect understanding of the aquifer system using models so that we can quantify the net depletions on surface water bodies that in most instances we also don't understand very well.

Potential model tools include: analytical-based models, numerical-based models, utilization of method of superposition, etc.

- 5) Once we have modeled, we then project how we need to mitigate or offset the projected depletion. Again, we are using a model established to project just what the consequences will be in that system that we probably do not understand all that well.

How well is HB 831 working?

- 1) Obviously, as the above information shows we are greatly handicapped from the start.
- 2) In relatively simple hydrogeologic settings it can work or be used with some sense of reliability. The hydrogeologic assessment should proceed pretty much in accordance with the procedures that have been historically used in the permitting process.

Some examples of simple hydrogeologic settings:

- A) Situations with no streams quantified to be within the projected "potentially affected area." Caution: even for this simple situation, based upon my experience with DNRC, they may still conclude that water is intercepted and consumed that will have sometime/somewhere flowed into a stream. DNRC may still conclude that some form of mitigation is required. Actual mitigation will probably be impractical or impossible in situations where there is no historic surface water use.
- B) Single stream systems (alluvial valley setting with a single stream). Allows use of simple analytical models such as Colorado's Alluvial Water Accounting System. This model is not a reliable tool for use in multiple stream settings.
- 3) Complex hydrogeologic/surface water settings. We probably cannot meet the intent or language of HB831 if we have complex conditions. What will be the process employed by hydrogeologists and water resource consultants in complex settings?

- To simplify, define which surface water feature/features are most relevant, analyze and model.
 - Hurdles will include DNRC permitting analysis for “correct and complete” and the objection phase.
 - The objectors now have a new treasure trove of means to impede the beneficial use permitting process.
- 4) Some complex conditions:
- Multilayer aquifer systems;
 - Aquifer systems showing horizontal spatial variability.
 - Fracture flow systems;
 - Aquifer systems where mitigation is infeasible such as:
No historic irrigation practices; and
Geologic limitations (e.g., shallow strata low permeabilities).
 - Field examples will be given.
- 5) Burden of proof for technical work is high and probably attainable in most cases.

What are/will be some of the consequences (intended and unintended)?

- 1) Projected to protect senior appropriators.
- 2) Forces development to occur where the surface water irrigation is. In effect, will tend to focus development to the vicinity of streams where water exists for mitigation/recharge purposes.
- 3) The process complexity and uncertainty of results will lead to developers going the exempt well route which is a path of least resistance.
- 4) Except in very unique situations, it will be nearly impossible to obtain beneficial use permits for agricultural well irrigation purposes.
- 5) May actually reduce the amount of surface water availability to irrigators during the critical irrigation season. This is mainly an issue if aquifer recharge is employed. Some have been advising irrigators they will have

more water available during the irrigation season if aquifer recharge is employed is in many instances misleading.

- 6) The non-irrigation season issue that results from employing surface water mitigation procedures is being used by objectors as a way to thwart beneficial use applications.
- 7) Create a water market economy which may price water out of the reach of most agricultural irrigators. Irrigation water in many instances may have historically been abandoned and the next water user in the appropriation sequence then benefitted. Now, the putting of the water in infiltration basins or use of recharge as a means to address HB831 can actually circumvent the historical process of first-in-time first-in-right. This is simply because much of the surface water that would have been available for in stream use (e.g., irrigator or fisheries during July and August) may now appear in streams as delayed return flow or returning during the non-irrigation season (say October through March) if recharge is employed. The net result is to benefit those junior appropriators that rely on water during the non-irrigation season (such as power generating facilities).

What are some of solutions?

- 1) It is most appropriate to conduct comprehensive watershed water budget evaluations at either a watershed or sub-watershed scale to determine just what the significance is before requiring a process that may not even be necessary.
- 2) Simplify the process and make it workable. Define a reasonable "potentially affected area." Relax the 0.01 foot cone-of-depression criterium. Also, if we are going to require mitigation and recharge simplify the analytical requirements.
- 3) Develop basin or sub-basin mitigation/aquifer recharge strategies on a larger scale that can benefit more existing and potential users.
- 4) Some examples using Gallatin Valley watershed will be presented.